

Application No. 10/672,892
Reply to Office Action Dated 05/06/2004
Amendment Dated 7/19/2004

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

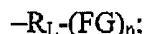
1. (Original) A process for preparing the polyurethane derivative, the process comprising:
providing a polyurethane comprising a urethane amino moiety;
providing a multifunctional linker reagent of a formula:



wherein n is an integer from 1 to 3, FG is a functional group selected from the group consisting of a halogen, a carboxyl group, a sulfonate ester, and an epoxy group, LG is a leaving group selected from the group consisting of a halogen, a carboxyl group, a sulfonate ester, and an epoxy group, and R_L is an $(n+1)$ -valent organic radical comprising at least one carbon atom;

providing a protected thiol-containing reagent of a formula R-C(O)SH , or a salt thereof, wherein R is a C_1 to C_6 alkyl group;

reacting the multifunctional linker reagent with the urethane amino moiety to form a polyurethane substituted with at least one substituent group of a formula



reacting the polyurethane substituted with at least one substituent group with a protected thiol-containing reagent to form the polyurethane comprising the thiol substituent pendant from a urethane nitrogen.

2. (Original) The process of claim 1, wherein R_L is a bivalent organic radical selected from the group consisting of C_1 to C_{18} alkylene, C_1 to C_{18} alkyleneamino, C_1 to C_{18} alkyleneoxy, C_1 to C_{18} haloalkylene, C_2 to C_{18} alkenylene, C_6 to C_{18} arylene, a modified C_2 to C_{18} alkenylene having at least one carbon substituted by a halogen group, C_2 to C_{18} alkenylene having one or more O, S, or N atoms incorporated into an alkenylene chain, a bivalent heterocyclic radical, and mixtures thereof.

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3. (Original) The process of claim 2, wherein R_L is a member selected from the group consisting of C_1 to C_6 alkylene.
4. (Original) The process of claim 2, wherein R_L is butylene, FG is a bromo group, LG is a bromo group and n is 1.
5. (Original) The process of claim 1, wherein LG is a bromo group.
6. (Original) The process of claim 1, wherein the sulfonate ester is a member selected from the group consisting of mesylate, triflate, and tosylate.
7. (Original) The process of claim 1, wherein the sulfonate ester is a member selected from the group consisting of a ω -bromoalkyl mesylate, a ω -bromoalkyl triflate, and a ω -bromoalkyl tosylate.
8. (Original) The process of claim 1, wherein the multifunctional linker reagent is a member selected from the group consisting of a dibromoalkyl compound, a bromo-carboxyalkyl compound, and a bromo-epoxyalkyl compound.
9. (Original) The process of claim 8, wherein the dibromoalkyl compound is a 1, ω -dibromoalkyl compound or a substituted 1, ω -dibromoalkyl compound.
10. (Original) The process of claim 9, wherein the dibromoalkyl compound is a C_2 - C_6 1, ω -dibromoalkyl compound.
11. (Original) The process of claim 9, wherein the dibromoalkyl compound is 1,6-dibromohexane or 1,4-dibromobutane.
12. (Original) The process of claim 8, wherein the bromo-carboxyalkyl compound is a ω -bromocarboxylic acid or a substituted ω -bromocarboxylic acid.
13. (Original) The process of claim 8, wherein the bromo-epoxyalkyl compound is epibromohydrin.
14. (Original) The process of claim 1, wherein the process is conducted in a presence of an aprotic solvent.
15. (Original) The process of claim 14, wherein the aprotic solvent is a member selected from the group consisting of N,N-dimethylacetamide, N,N-dimethyl formamide, 1-methyl-2-pyrrolidinone, tetrahydrofuran, dioxane, and dimethyl sulfoxide.

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16. (Original) The process of claim 1, wherein the process is conducted in a presence of a base soluble in the aprotic solvent.

17. (Original) The process of claim 16, wherein the base is a member selected from the group consisting of sodium hydride, lithium diisopropylamide, and sodium.

18. (Original) The process of claim 16, wherein the base is potassium tert-butoxide, dimethyl sodium, lithium hydride, sodium amide, lithium N,N-dialkylamide, or lithium N,N-dicyclohexylamide.

19. (Original) The process of claim 16, wherein the base is lithium tert-butoxide.

20. (Original) The process of claim 18, wherein the multifunctional linker reagent is 1,6-dibromohexane, and the base is lithium diisopropylamide.

21. (Original) The process of claim 9, wherein the multifunctional linker reagent is 1,4-dibromobutane.

22. (Original) The process of claim 1, wherein the protected thiol-containing reagent is thiolacetic acid.

23. (Original) The process of claim 1, wherein the protected thiol-containing reagent is tetrabutylammonium thioacetate.

24. (Currently Amended) A process of preparing a polyurethane derivative, the process comprising:

providing a polyurethane;

providing a multi-functional linker, wherein the multi-functional linker has a leaving group and a functional group;

providing a protected thiol-containing reagent comprising a thiolic moiety;

contacting the polyurethane with the multi-functional linker in the presence of an aprotic solvent and a base such that the leaving group reacts with the polyurethane to form a polyurethane substituted with at least one substituent group; and

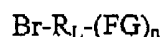
contacting the polyurethane substituted with at least one substituent group with a protected thiol-containing reagent such that the functional group reacts with the thiolic moiety to form the polyurethane derivative having a thiol substituent comprising a sulfur atom connected to the polyurethane derivative and a fragment connected to the sulfur atom, wherein the thiol

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substituent is reacted thiol substituent pendant pending from the polyurethane derivativetherefrom, provided that when the fragment is removed, the sulfur atom remains pending from the polyurethane derivative.

25. (Original) The process of claim 24, wherein the leaving group is a bromo group and the functional group is a member selected from the group consisting of halogen, a sulfonate ester, a carboxyl group, and an epoxy group.

26. (Original) The process of claim 24, wherein the multi-functional linker is represented by the formula:



wherein n is an integer from 1 to 3, FG is a functional group selected from the group consisting of a halogen, a carboxyl group, a sulfonate ester, and an epoxy group, and R_L is an (n+1)-valent organic radical comprising at least one carbon atom.

27. (New) The process of claim 24, wherein the thiol substituent is represented by the formula: -R_L-(S-R¹)_n

wherein n is an integer from 1 to 3, and R¹ is at least one of C(O)R³ and SR⁴, wherein R³ is a C₁ to C₆ alkyl group and R⁴ is a heterocyclic group or an electron deficient aromatic group.